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STATE OF WASHINGTON

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DEPARTMENT OF ECOLOGY
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WA-45-1020

MEMORANDUM
February 6, 1981

To: Harold Porath

From: Shirley Prescott, Art Johnson

Subject: Wenatchee River Water Quality in the Vicinity of Leavenworth and Cashmere Sewage Treatment Plants, October 14, 1980.

Introduction

A water quality survey of the Wenatchee River above and below the Leavenworth and Cashmere sewage treatment plants was conducted on October 14, 1980 concurrent with Class II inspections of these facilities. The Class II results have been reported in separate memoranda by Sharon Chase and Will Abercrombie. In brief, their results showed the Leavenworth plant (in the process of upgrade) to be in violation of effluent total suspended solids limitations. The Cashmere effluent quality was within permit limits. The condition of the receiving waters is described below.

Methods

Grab samples of river water were collected at sites above each outfall and at 500, 1000, and 2000 feet below the outfalls. These sites were largely dictated by river accessibility and are shown in Figures 1 and 2.

Field determinations were made for temperature (°C), specific conductance (μmhos/cm), dissolved oxygen (Winkler), and chlorine residual (DPD). In addition, water samples were packed in ice and returned to the DOE Tumwater laboratory for analysis of the following parameters according to Methods for Chemical Analysis of Water and Wastes, EPA 1977.

1. Turbidity (NTU)
2. Total Ammonia-nitrogen (mg/l)
3. Nitrite-nitrogen (mg/l)
4. Nitrate-nitrogen (mg/l)
5. Orthophosphate-phosphorus (mg/l)
6. Total phosphate-phosphorus (mg/l)
7. Fecal Coliform (col/100 ml)
8. Total Suspended Solids (mg/l)
9. Total Hardness (mg/l)
10. Total Alkalinity (mg/l)
11. Chemical Oxygen Demand (mg/l)

Results

The Wenatchee River was in a low-flow condition at the time of this survey. The USGS gaging station at Monitor, about three miles below

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Cashmere, measured 620 cfs on October 14. The extreme low for this station's period of record was 362 cfs with an average flow of 3,376 cfs. DOE Water Quality Indices (WQI's) calculated using routine monitoring data from station 45A110 near Leavenworth showed this reach to be typically high in quality:

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	Temp.	D.O.	pH	Bact.	Trophic	Aesth.	Susp. Solids	Ammonia Toxic	Overall Index Rating
$\bar{X}$	9.8	7.5	7.0	7.9	4.6	5.9	(9.9)	0.5	6.7
45A070	12.0	7.4	6.3	9.1	5.1	5.9	(12.9)	0.7	7.7
45A110	5.5	7.8	8.3	5.5	3.7	5.9	(7.9)	0.0	3.3

Parentheses indicate that parameter was not used in the generation of the overall index rating.

Table 1 summarizes the results from this survey's field measurements and river sampling. Even though the river was low, dilution ratios were estimated at about 1500:1 for both plant effluents. As a result, no evidence of sewage was seen in the data. Water quality below both outfalls met state Class AA stream standards.

When the Leavenworth results are compared to those from Cashmere 14 miles downstream, the major change noted -- other than small increases in temperature, pH, specific conductance, and dissolved oxygen -- is an order of magnitude increase in nitrate-nitrogen concentrations. Whether this increase is natural or man-induced is not known. Routine monitoring data are not available on the Wenatchee River at Cashmere. Limited data have been collected upstream at Dryden (USGS station 12461001) midway between Leavenworth and Cashmere during the period October 21, 1975 to September 21, 1976. These data indicate that increases in nitrate-nitrogen concentrations to levels approaching those observed at Cashmere during this survey are not unusual.

Summary

1. Wenatchee River water quality was not measurably affected by effluent from the Leavenworth or the Cashmere STP's. This was due to rapid dilution by large volumes of river water.
2. The receiving waters met state Class AA standards above and below both outfalls.
3. River nitrate-nitrogen concentrations increased by an order of magnitude between Leavenworth and Cashmere. The source(s) of this nitrate was not determined.

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Attachments

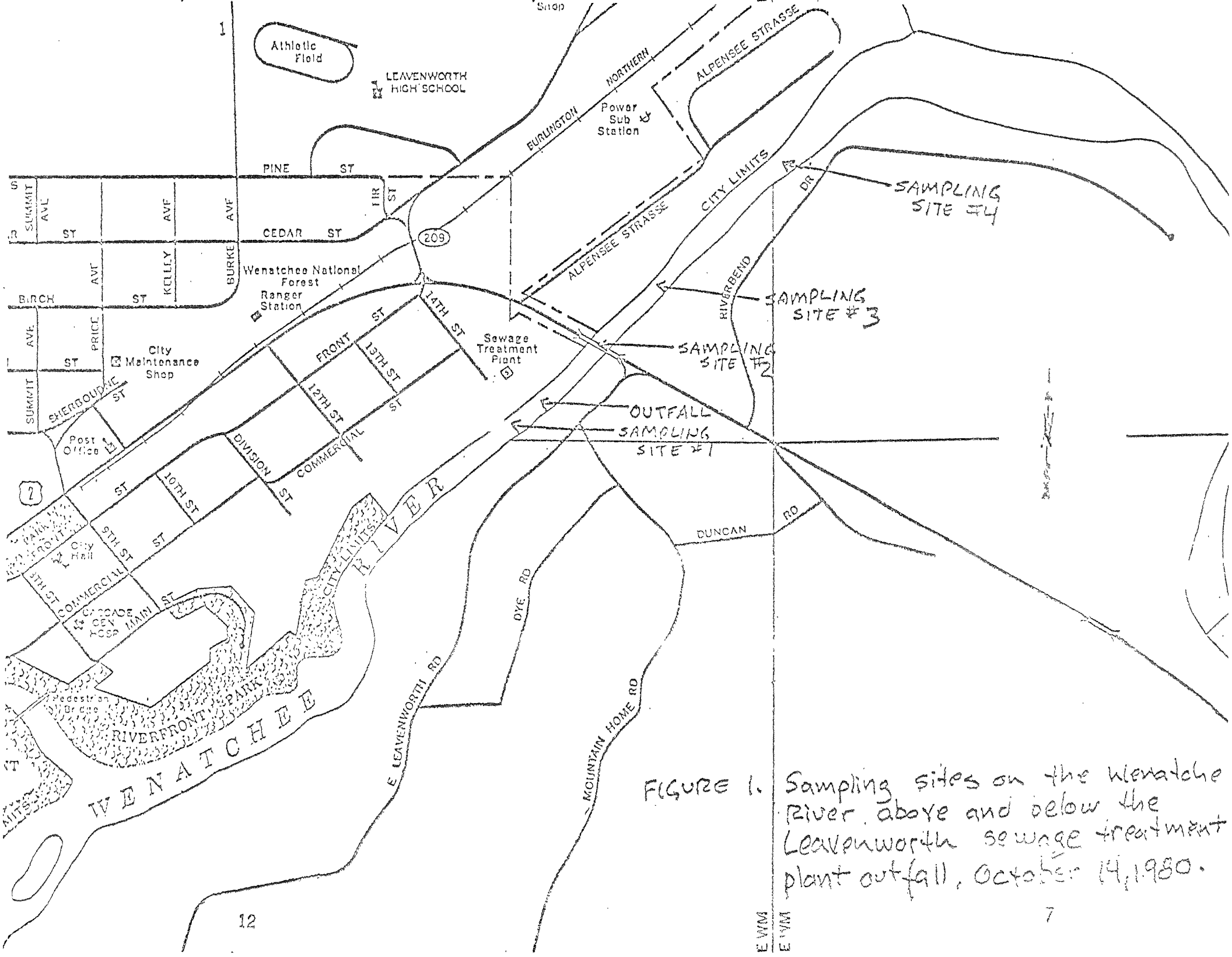

FIGURE 1. Sampling sites on the Wenatchee River above and below the Leavenworth sewage treatment plant outfall, October 14, 1980.

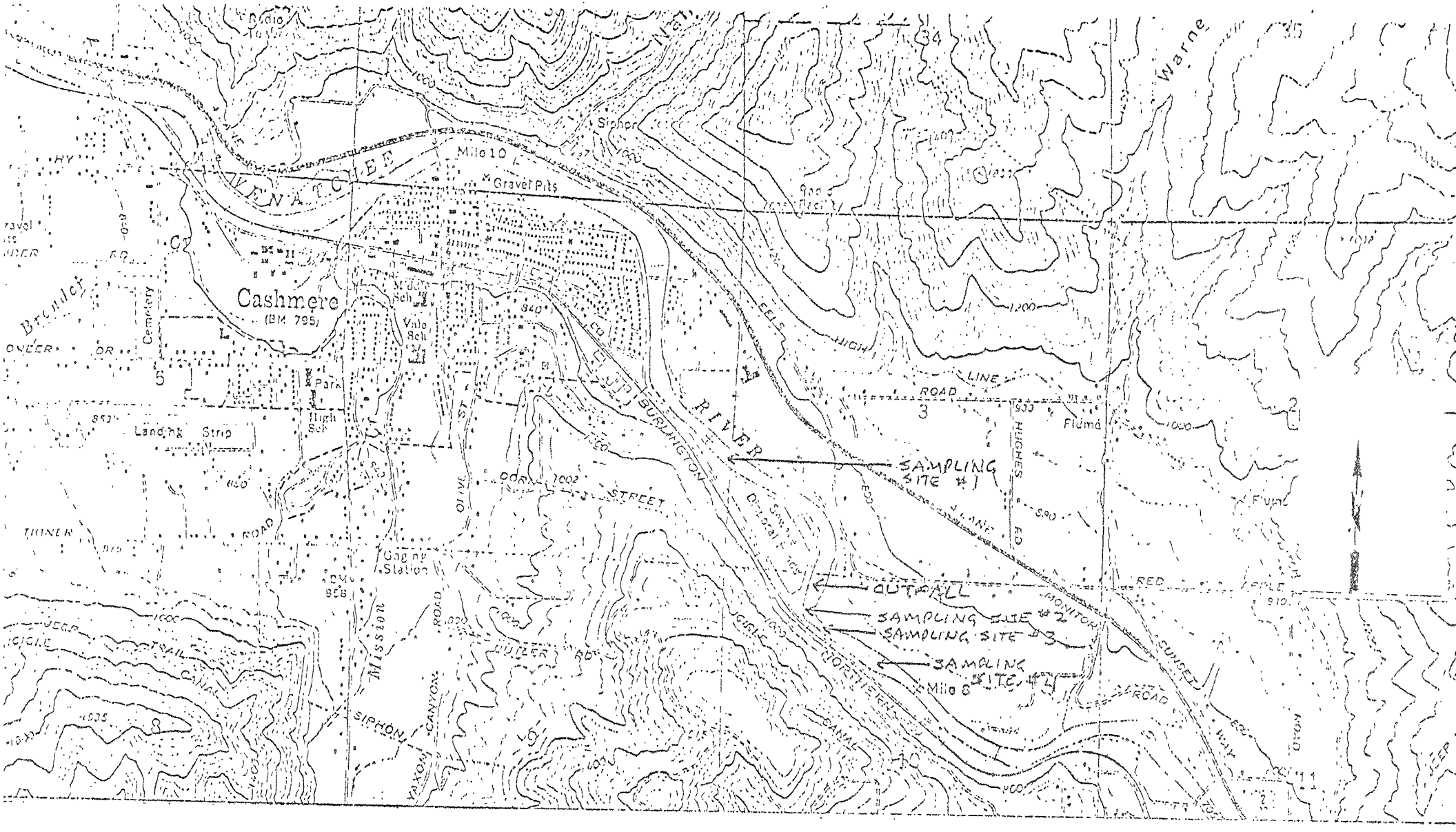

FIGURE 2 Sampling sites on the Wenatchee River above and below the Cashmere sewage treatment plant outfall: October 14, 1980.

nworth and Cashmere Sewage Treatment Plant Outfalls, October 14, 1980.

COD (mg/l)	NO_3-N (mg/l)	NO_2-N (mg/l)	NH_3-N (mg/l)	O-PO_4-P (mg/l)	T-PO_4-P (mg/l)	TSS (mg/l)	Fecal Coliform (col/100 ml)	Total Hard. (mg/l)
9	.01	<.01	<.01	<.01	.02	4	2[a]	44
160	<.25	<.25	11	5.0	6.3	100	<2	--
13	.01	<.01	<.01	<.01	.02	5	3[a]	40
9	.01	<.01	.01	<.01	.02	<1	3[a]	48
4	<.01	<.01	.01	<.01	.02	3	12[a]	36
18	.14	<.01	<.01	<.01	.02	2	1[a]	52
200	<.10	<.10	2.2	5.5	7.4	63	200	--
9	.13	<.01	<.01	<.01	.02	5	18[a]	48
4	.14	<.01	<.01	<.01	.02	4	7[a]	48
4	.14	<.01	<.01	<.01	.02	4	6[a]	52

[a]Estimated
[b]24-hour composite
[c]None detected